



EXECUTIVE SUMMARY

EEAP, NORFOLK DISTRICT

ABERDEEN PROVING GROUNDS, MARYLAND

# BOILER/ CHILLER



### DEPARTMENT OF THE ARMY

CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS P.O. BOX 9005 CHAMPAIGN, ILLINOIS 61826-9005

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#### FINAL REPORT

#### EXECUTIVE SUMMARY

EEAP, NORFOLK DISTRICT

ABERDEEN PROVING GROUNDS, MARYLAND

# BoilER/ CHILLER

### Prepared for:

Department of the Army Norfolk District, Corps of Engineers Norfolk, Virginia 23510

Under Contract No. DACA-65-84-C-0105

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Approved to public relocated Distribution University

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#### SECTION 1

#### EXECUTIVE SUMMARY

#### 1.1 INTRODUCTION

This report presents the results of the Energy Engineering Analysis Program conducted by Roy F. Weston, Inc. at the Aberdeen and Edgewood Areas of Aberdeen Proving Grounds under Contract No. DACA-65-84-C-0105. The study includes evaluation of boiler and chiller plant performance by tests, identification and analysis of specific efficiency improvements, evaluation of existing equipment condition and maintenance procedures, and project development and documentation preparation.

The report consists of six volumes - one set of three for the Aberdeen Area and one set of three for the Edgewood Area. Each set consists of:

Volume I: Survey and Test Results

Volume II: Evaluation of Energy Conservation Opportunities

Volume III: Appendix

Volume I contains results of the field survey and tests performed on the boiler and chiller plants. The report evaluates the condition of existing equipment and highlights specific efficiency improvements. Volume II contains detailed calculations for the various energy conservation opportunities. Volume III contains the life cycle cost analysis for all applicable energy conservation opportunities.

### 1.2 HISTORICAL ENERGY CONSUMPTION

Table 1.1 and 1.2 summarizes the total annual fuel oil and electric consumption for Aberdeen and Edgewood for FY 1984. A total of 15,272,456 gallons of fuel oil and 141,463,804 kWh electricity were required from October 1983 to September 1984. Fuel oil consumption for FY84 was 10.75% higher than for FY83 and electric consumption was up 6.59% over FY83. Since this study is restricted to specific boiler and chiller plants as mentioned in the scope of work, it is helpful to summarize the annual fuel oil consumption in those specific boiler plants. Table 1.3 lists the annual fuel consumption for Aberdeen Area and Table 1.4 lists the same for the Edgewood Area. No electric metering was available for individual buildings.

### 1.3 FINDINGS

The work done was performed in two phases. The first phase involved site visits, data collection and performance tests on the boiler and chiller plants. Volume I summarizes these results. The second phase involved evaluation of various energy conservation opportunities (ECOs) and economic analysis.

TABLE 1.1

TOTAL FUEL OIL (GALLONS) CONSUMPTION FOR FY '84

Total	826,960	1,422,162	2,128,173	2,729,905	1,986,092	2,048,381	1,371,199	821,778	464,437	539,096	440,868	493,405	15,272,456
Edgewood Area	556,665	806,840	1,106,545	1,331,365	1 039,982	1,043,346	697,809	753,928	414,336	434,349	373,406	394,759	8,953,330
Aberdeen Area	270,295	615,322	1,021,628	1,398,540	946,110	1,005,035	673,390	67,850	50,101	104,747	67,462	98,646	6,319,126
	Oct 83	Nov 83	Dec 83	Jan 84	Feb 84	Mar 84	Apr 84	May 84	Jun 84 ·	Jul 84	Aug 84	Sep 84	TOTAL

Cost of Fuel Oil = \$1.03/gallon

Source: Utilities Division, Mr. Larry Taylor

TABLE 1.2
TOTAL ELECTRICITY CONSUMPTION FOR FY '84

Cost		425,634	386,635	444,336	401,510	402,050	418,601	404,651	418,007	849,848	879,678	897,058	798,965	\$6,726,982
	MBTU	126,002 \$	112,202	129,577	116,907	116,677	122,570	120,346	128,134	166,871	172,165	175,376	154,145	1,640,980
Total	KWH	10,862,227	9,672,590	11,170,399	10,078,177	10,058,319	10,567,123	10,374,679	11,045,985	14,385,445	14,841,772	15,118,668	13,288,420	141,463,804
1 Area	MBTU	54,314	45,129	50,985	44,594	44,790	47,115	47,467	55,135	72,634	75,239	75,571	66,549	679,522
Edgewood Area	KWH	4,682,259	3,890,416	4,395,239	3,844,291	3,861,221	4,061,672	4,091,976	4,753,010	6,261,532	6,486,103	6,514,776	5,737,019	58,579,513
n Area	MBTU	71,688	67,073	78,592	72,313	71,887	75,463	72,879	72,999	94,237	96,926	99,805	87,596	961,458
Aberdeen Area	KWH	6,179,968	5,782,175	6,775,160	6,233,886	6,197,098	6,505,451	6,282,703	6,292,975	8,123,913	8,355,669	8,693,892	7,551,401	82,884,291
		Oct 83	Nov 83	Dec 83	Jan 84	Feb 84	Mar 84	Apr 84	May 84	Jun 84	Jul 84	Aug 84	Sep 84	TOTAL

Source: Utilities Division, Mr. Larry Taylor

TABLE 1.3

ANNUAL FUEL OIL CONSUMPTION FOR FY84

FOR ABERDEEN AREA

Building #	Tank Size	Annual Fuel Oil Consumption (Gals.)
338 345A 345B 345C 455 507 525 629 1064 2312	1-15,000 1-100,000 1-200,000 1-70,000 1-10,000 1-15,000 1-10,000 1-10,000 1-10,000 1-10,000	84,338.2 220,032.9 675,674.0 759,972.1 68,344.8 101,009.1 119,629.4 25,087.4 53,776.0 67,994.2 71,237.6
2352 2377 2431 2457 2483 2502 2757 2915 3031 3062 3070A 3638 4119 4219	1-10,000 1-8,000 1-8,000 1-8,000 1-15,000 1-13,000 1-10,000 1-8,000 2-10,000 1-25,000 1-10,000 1-15,000 1-12,000	29,826.0 25,893.3 31,582.6 40,027.9 153,740.7 146,336.8 163,726.7 35,401.0 147,150.2 113,020.7 71,143.9 151,377.2 278,887.5
4304 4305 5033 5043 5206 5258 5413 5454	1-15,000 1-10,000 1-10,000 1-20,000 1-20,000 1-10,000 1-4,000 1-2,000 1-12,000	59,515.7 86,201.1 113,650.6 45,394.3 105,739.5 23,037.3 10,815.2 35,386.8

4,114,950.7

Source: Utilities Division, Mr. Larry Taylor

TABLE 1.4

ANNUAL FUEL OIL CONSUMPTION FOR FY84

FOR EDGEWOOD AREA

Building #	<u>Tank Size</u>	Annual Fuel Oil Consumption (Gals.)
E1574 E2100	3-8,000 1-20,000	126,693.7 141,549.7
E3148	2-15,000	7,081.5
E3302	1-60,000	328,895.1
E3312	2-50,000 1-100,000	2,812,006.0
E4160	2-14,000	323,766.2
E5126	2-100,000	3,958,560.9
E5828A	2-8,000	124,671.8
E6560	1-15,000	249,918.7
		8,073,143.6

Source: Utilities Division, Mr. Larry Taylor

A list of Energy Conservation Opportunities (ECOs) to be investigated is contained in the Scope of Work. This list, along with previous energy conservation retrofit experience and the observations and data obtained from the site visits, provided a basis for a list of ECOs to be quantitatively analyzed. The opportunities involved are:

### Boiler Plant

- o Boiler Economizer
- o Boiler Trim Controls
- o Combustion Air from Ceiling
- o Blowdown Controls
- o Installation of New Burners
- o Boiler Operation Optimization
- o Reduce Steam Pressure
- o Reduction in Make-up Water
- o Variable Speed I.D. Fans/Blowers
- o Air vs. Steam Atomization
- o Boiler Replacement Study

### Chiller Plant

- o Chilled Water Temperature Reset
- o Condenser Water Temperature Reset
- o Small Chiller Application
- o Free Cooling
- o Automatic Variable Pitch Tower Fans
- o Variable Speed Tower Fans
- o Chiller Operation Optimization
- o Cycling Circulating Pumps
- o Condenser Water Treatment
- o Variable Speed Chilled Water Pumps
- o Chiller Replacement Study

Tables 1.5 and 1.6 show dot matrices for the Aberdeen and Edgewood areas which illustrate the applicable buildings for each ECO. Based on the energy calculations and financial analysis, (Volume II and III), a list of all projects having SIR > 1 is summarized in Tables 1.7 and 1.8 for the Aberdeen and Edgewood areas, respectively. Some of the ECOs are synergistic with others and totalling all the savings figures will result in double-dipping. To avoid this, only those ECOs that will not lead to double-dipping are recommended. For example, condenser water temperature reset and variable speed tower fan drives result in similar savings and only the one with the higher SIR value is recommended. Also, projects having SIR value close to unity and projects having payback of more than 10 years are not recommended.

Volume II of the report also highlights the state of maintenance at the two bases and includes operation and maintenance recommendations that should be followed.



**ENERGY CONSERVATION OPPORTUNITIES Energy Engineering Analysis Program** Location: APG, Aberdeen Area Variable Speed Tower Fan Drives Auo Variable piloh Tower Fans - Colimication of Chillips Operation Shuming Officer of the second **Equipment: Chiller Plants** Updated: October 1985 Somo CHW Dumos Condenser Water Treatment Tonis Hemery Short Small Chiller Application A Posor Cond Water Temp. Note: ● Denotes ECO's Applicable ▲ Building is Currently Served by a Temporary Chiller, Therefore no ECO's Are Recommended Remarks Installation • • 30 Building • • Building 120 • Building 314 Building 390 Building 392 • • • Building 393 • Building 394 lacktriangle• • Building 400 • Building 2207 • • **Building 2401** • **Building 2501** • • **Building 3144 Building 3147 Building 3148 Building 3326** Building 4305

TABLE 1.5 ENERGY CONSERVATION OPPORTUNITIES MATRIX (ABERDEEN AREA)



**Energy Engineering Analysis Program ENERGY CONSERVATION OPPORTUNITIES** Location: APG, Aberdeen Area - Boller Operation Oplimication | C Equipment: Boiler Plants 4/1/5 Steam Alomization Updated: October 1985 Signal Pessure A Reducion in Wate (10 W Fans Bowers Combustion Air from C 1 810 moom Controls 4 nstallation of New 8 Note: ● Denotes ECO's Applicable ▲Indicates Boiler is Either Obsolete or New Boiler is Being Installed (See Remarks) \* Boiler > · Boiler Installation Remarks # 345 - Boiler No. 1 • • • • • • Boiler No. 2 • • • • . • Boiler No. 3 • • • • Three new boilers are # 525 being installed now. 507 - Boiler No. 1 Obsolete unit. Boiler No. 2 • • Boiler No. 3 • • # 2502 - Boiler No. 1 • • • Boiler No. 2 • • Boiler No. 3 • # 3638 - Boiler No. 1 • • Status of building is unknown. Boiler No. 2 • • # 4119 - Boiler No. 1 • • • Boiler No. 2 • • • Boiler No. 3 • • # 4219 - Boiler No. 1 • Boiler No. 2 ٠ Boiler No. 3 • Boiler No. 4 • • # 4305 - Boiler No. 1 • • Boiler No. 2 • lacktrian# 338 - Boiler No. 1 • • Boiler No. 2 •



ENERGY Energy Engineering Analysis Program CONSERVATION OPPORTUNITIES Location: APG, Aberdeen Area - Boiler Operation Optimization of Installation of New Burners L. Equipment: Boiler Plants 4" Vs Siesm Alomization Reduce Steam Property of the Party of the Pa Jones mem Stucy Updated: October 1985 A Acounian Market Clow Combustion Air from C Somoom Comore - Boiles Trim Controls Note: ● Denotes ECO's Applicable ▲Indicates Boiler is Either Obsolete or New Boiler is Being Installed (See Remarks) · Boiler Installation Remarks # 455 - Boiler No. 1 Boiler No. 2 629 - Boiler No. 1 • Boiler No. 2 • May be replaced. # 2377 - Boiler No. 1 • • Boiler No. 2 • # 2312 - Boiler No. 1 • Boiler No. 2 Boiler No. 3 # 2483 - Boiler No. 1 Obsolete unit is to be replaced. Boiler No. 2 # 2431 - Boiler No. 1 • Boiler No. 2 • # 2457 - Boiler No. 1 • • Obsolete unit is to Boiler No. 2 be replaced. # 3062 - Boiler No. 1 • Boiler No. 2 • • # 3031 - Boiler No. 1 • • # 5033 - Boiler No. 1 • Boiler No. 2 • # 5206 - Boiler No. 1 • Boiler No. 2 • • # 1064 - Boiler No. 1 • Boiler No. 2



Energy Engineering Analysis Program Location: APG, Aberdeen Area Equipment: Boiler Plants Updated: October 1985  Note: • Denotes ECO's Applicable Indicates Boiler is Either Obsolete or New Boiler is Being Installed (See Remarks)			2 1 1 000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		00 Air ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	CO Mo Mo Me	,		ATI	OP	PPORTUNITIES  PORTUNITIES  PORT
Installation	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\										Remarks
# 5258 - Boiler No. 1	•	•	•		•						
# 5454 - Boiler No. 1	•	•	•		•						
Boiler No. 2	•	•	•		•						
# 4304 - Boiler No. 1	lack	▲	<b>A</b>	A	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>		New boiler being installed.
Boiler No. 2	•	•	•							•	
# 2352 - Boiler No. 1	•	•	•								
# 3070 - Boiler No. 1	•	•	•								
Boiler No. 2	•	•	•								
# 5043 - Boiler No. 1	•	•	•		•						
# 5413 - Boiler No. 1	•	•	•							•	
# 2757 - Boiler No. 1	•	•	•		•						
Boiler No. 2	•	•	•		•						
# 2915 - Boiler No. 1	•	•	•		•						
Boiler No. 2	•	•	•		•						

TABLE 1.5 (CONTINUED)



Energy Engineering Analysis Program Location: APG, Edgewood Area Equipment: Chiller Plants Updated: October 1985  Note • Denotes ECO's Approxime		Z.	We let	F. (0) (0) (0) (0) (0) (0) (0) (0) (0) (0)	00/10 App/ 10/20 / 10/	(a)	7	7	7	7	TION	ERGY NOPPORTUNITIES
installation	්				8 / N	0 2 2						Remarks
Building E2100	•	•			•	•	•		•	•		
Building E3081	•	•				•	•		•	•		
Building E3100	•	•			•	•	•		•	•		
Building E3220	•	•				•	•		•	•		
Building E3244	•	•				•			•	•		
Building E3300	•	•	•		•	•	•		•	•		
Building E3580	•									•		
Building E5100	•	•			•	•	•		•	•		
Building E5101 n	•	•							•			
Building E5452	•	•							•			
Building E5951	•	•				•			•	•		

TABLE 1.6 ENERGY CONSERVATION OPPORTUNITIES MATRIX (EDGEWOOD AREA)



**ENERGY** Energy Engineering Analysis Program **CONSERVATION OPPORTUNITIES** Roules Seem Political Location: APG, Edgewood Area Installation of New Burners Air Vs Sieam Alomization Equipment: Boiler Plants A de dicolo n'in Wake Lo W Updated: October 1985 Combustion Air from C Somoom Comos BOW TIME COMPOS Boiler Replacement S Note: • Denotes ECO's Applicable ▲Indicates Boiler is Extre Obsolete or New Boiler is Being installed (See Remarks) Remarks Installation Standby plant Building E3148 - Boxier No. 1 Boiler has been replaced. Boxer No. 2 Boiler No. 3 • lacktrianVery old units. Building E2100 - Boiler No. 1 . Boiler No. 2 • • • Boper No. 3 Building E1574 - Boiler № 1 Boiler No. 2 • • Boiler No. 3 • Building E3312 - Boder No. 1 Boiler No. 2 • . Boiler No 3 ٠ Very old units. Bosier No. 4 Very old units. Boiler No. 5 • . . • Building E4160 - Boiler No. 1 Boiler No. 2 Boiler No. 3 • • Building E5126 - Boiler No. 1 Very old units. • Very old units. • • Botter No. 2 Very old units • • • • Boiler No. 3 • • • Very old units. Boiler No. 4 lacktrian• • • Very old units. Boiler No. 5 New unit being installed. Boiler No. 6

TABLE 1.6 (CONTINUED)



Energy Engineering Analysis Program Location: APG, Edgewood Area Equipment: Boiler Plants Updated: October 1985				/	4	co	NSE	RV	ATI	ON		PORTUNITIES
Note: ● Denotes ECC's Applicable  ▲ Indicates Boxier is Either Obscars > New Boxier is Being Installed (See See arks)			Solle Tribolity	Thurst and the	To low to low	Sallario Company		To lo line of the Bridge		10 F 14 68 118	M 27 00 00 00 00 00 00 00 00 00 00 00 00 00	Remarks
Installation												Remarks
Building E3302 - Boiler No. 1	•	•	•									
Boiler No. 2		<b>A</b>	A	A	<b>A</b>	A	A	▲	<b>A</b>	A	▲	New unit being installed
Building E5828 - Boiler No. 1	•	•	•	•								
Boiler No. 2	•	•	•	•								
Building E6560 - Boiler No. 1	•	•	•									
Boiler No. 2	•	•	•									

TABLE 1.6 (CONTINUED)

SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1 (ABERDEEN AREA)

		,					5			
	REMARKS			NOTE 1	NOTE 2		W.		RECOM	NOTE 2
	SIR			1.16	1.54		1.07		1.39	1.19
TOTAL	INVESTMENT			5926	2926		16743		21957	6926
AUNIAI	DOLLAR CAVINGS (4)			979	979		1928		4353	1253
ANNITAT	ENERGY COST	2001		1097	1097		2095		4573	1350
NGS	Fuel Oil	WBTU				S	t		ı	
ANNUAL ENERGY SAVINGS	ity	MBTU	ESET	212.1	212.0	DENSING UNI	405.2	LED WATER PUMPS	884.2	261.1
	Electricity	KWH	TEMPERATURE R	18285	18277	DRIVE ON COM	34930	CHILLED WATI	76220	22510
	BUILDING #		CHILLED WATER TEMPERATURE RESET	314	394	VARIABLE SPEED DRIVE ON CONDENSING UNITS	4305	VARIABLE SPEED CHIL	314	394

NOTE 1: This project is not recommended since it is synergistic with the variable speed CHW pump ECO and greater savings could be achieved by the latter.

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NOTE 2: New unit has been installed recently and therefore project is not recommended.

TABLE 1.7 CONFINUED)

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SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1 (ABERDEEN AREA)

	ANN	ANNUAL ENERGY SAVINGS	VINGS	TANNA	ANIMIA	TOTAL		
BUILDING #	Electricity	icity	Fuel Oil	ENERGY COST	DOLLAR CAVINCE (4)	INVESTMENT	SIR	REMARKS
1	KM	MBTU	MBTU	(4) CDNIAGO	(*) CONTAGO	•		:
BOILER ECONOMIZER	_							
345 - # 1,2 & 3		ı	16329	122302	119574	272767	3.67	RECOM
2502 -#1 & 2	,	•	965	7228	7000	44670	1.02	¥
2502 -#3	ı	ì	271.3	2032	1887	14470	1.32	RECOM
4219 -#4	•	ı	291.8	2186	2041	14470	2.24	RECOM
5206 -#2	t	1	559.8	4193	3943	24986	1.33	RECOM
2352 -#1	4	ı	245.9	1842	1683	15903	1.76	RECOM
2915 -#1	•	ı	751.0	5625	5379	24626	2.02	RECOM
2915 -#2	•	•	725.0	5430	5184	24626	1.94	RECOM
BOILER TRIM CONTROLS	STOP.							
345 -41,2,3	•	•	11373.2	85185	82898	57176	12.14	RECOM
2502 -# 1	,	•	1744.4	13066	12303	19058	4.35	RECOM
-# 2	•	•	1212.9	9084	8322	19058	2.95	RECOM
2352 -# 1	,	ı	297.5	2228	1466	19058	1.46	RECOM
2915 -# 2	•	ı	1939.9	14530	13767	19058	99.9	RECOM

TABLE 1.7 (CONTINUED)

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SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1 (ABERDEEN AREA)

	ANNUAL	ANNUAL ENERGY SAVINGS	VINGS	AMMITAS	ALIMETAT	17.502			
BUILDING #	Electricity	ity	Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	SIR	REMARKS	
<b>,</b>	KWH	MBTU	MBTU	CA) CDNIAVC	(a) CONTARC	•			
COMBUSTION AIR FROM CEILING	ROM CEILING								l
345 -# 1,2 & 3		•	1109.6	8311	7973	56324	1.2	N.	100
2502 -# 1 & 2	,	•	234.9	1759	1650	10977	1.01	æ	<u>r</u> ,
2915 -# 1 & 2	1	1	198.5	1487	1366	12125	1.05	æ	o's
BOILER BLOWDOWN									
345 -# 1,2,3	ı	ı	1121.0	8396	8238	15835	4.35	RECOM	
INSTALLATION OF NEW BURNER	NEW BURNER								
2915 -# 1 & 2	1	ı	3705.4	27754	28608	85378	3.05	RECOM	
					12.	8888			
TOTALS FOR RECOMMENDED			2916						
PROJECTS	76, 220	884.2	40,568	308, 426	299,646	648,426	1		

NOTE: NR indicates projects not recommended since SIR value is close to unity.

TABLE 1.8

pg 1 of 4

SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1 (EDGEWOOD AREA)

(\$) SAVINGS (\$)  1726 1741 1626 1178 3389 1763 1302 1334 4239 2536 2278 1373 1373 1373 1054 8934 3246		ANNU	ANNUAL ENERGY SAVINGS	INGS	ANDITAL	AUMIAI	TOTA!		
HBTU  19.3 - 1664 1726 6879  58.9 - 1764 1626 6879  58.9 - 1764 1626 6879  57.7 - 1315 1178 6879  57.7 - 1315 1178 6879  57.7 - 1315 1178 6879  58.8 - 1901 1763 6879  58.8 - 1464 1334 7516  98.5 - 1462 1334 7516  99.5 - 2428 2536 6483  94.5 - 2428 2278 7516  310 - 1523 1373 7516  17.3 - 2428 2278 7516  17.3 - 2428 2278 7516  17.3 - 2428 2278 7516  17.3 - 2428 2278 7516  17.3 - 2428 2278 7516  17.3 - 3679 3468 21099  48.7 - 4147 3936 21099  67.9 - 2299 2187 11259  67.9 - 2299 2187 11259  67.9 - 2299 2187 1054  9764  874.7 - 9212 6934 27837  93.4 - 3457 3246 10547	BUILDING #	Electri	icity	Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	SIR	REMARKS
79.3       -       1864       1726       6879         56.9       -       1879       1741       6879         56.9       -       1764       1626       6879         67.7       -       1315       1178       6879         66.8       -       1362       1178       6879         66.8       -       1901       1763       6879         66.8       -       1901       1763       6879         66.8       -       1901       1763       6879         66.8       -       1901       1763       6879         66.9       -       1901       1763       6879         66.9       -       1487       3369       6879         67.1       -       1484       1334       7516         60.1       -       1484       1334       7516         42.5       -       2428       2278       7516         43.9       -       1523       1373       7516         43.9       -       1523       1373       7516         44.7       -       2299       2187       11259         34.3       -       1151<		KWH	HBTU	HBTU	SAVINGS (#)	SAVINGS (*)	6		
.3       -       1864       1726       6879         .3       -       1879       1741       6879         .9       -       1764       1626       6879         .9       -       1315       1178       6879         .8       -       1301       1763       6879         .8       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1462       1334       7516         .9       -       2428       2536       6483         .2       2228       2278       7516         .9       -       1523       1373       7516         .9       -       4147       3936       21099         .7       -       3679       3468       22099         .13       -       4447       3468       24179         .9       -       2299       2187       11259         .9       -       2299       2187       4479	CHILLED WATER T	EMPERATURE	RESET						
.3       -       1879       1741       6879         .9       -       1764       1626       6879         .9       -       1764       1626       6879         .8       -       1315       1178       6879         .8       -       1901       1763       6879         .8       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1442       1334       7516         .1       -       1484       1334       7516         .2       -       2426       2536       6483         .5       -       2426       2536       6483         .5       -       2426       2536       6483         .5       -       2428       2278       7516         .9       -       1523       1373       7516         .9       -       1523       13468       21099         .9       -       2299       2187       11259         .9       -       2299       2187       11259         .9       -       2073       1954 <t< td=""><td>E2100</td><td>32699</td><td>379.3</td><td>•</td><td>1864</td><td>1726</td><td>6879</td><td>2.23</td><td>Note 1</td></t<>	E2100	32699	379.3	•	1864	1726	6879	2.23	Note 1
.9       -       1764       1626       6879         .7       -       1315       1178       6879         .8       -       3527       3389       6879         .8       -       1901       1763       6879         .8       -       1901       1763       6879         .9       -       1452       1302       6879         .1       1464       1334       6879       6879         .2       -       1484       1334       7516         .3       -       4389       4239       7516         .5       -       2426       2536       6483         .5       -       2426       2536       6483         .5       -       2426       2536       6483         .5       -       2426       2536       6483         .5       -       4147       3936       21099         .7       -       3679       3468       21099         .9       -       4144       3468       21099         .9       -       2299       2187       11259         .9       -       2299       2187	E3081	32960	382.3	ı	1879	1741	6879	2.35	Note 1
.7       -       1315       1178       6879         .8       -       3527       3389       6879         .8       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1901       1763       6879         .9       -       1452       1302       7516         .1       -       1484       1334       7516         .3       -       4389       4239       7516         .5       -       2428       2536       6483         .2       -       2428       2278       7516         .9       -       4147       3936       21099         .7       -       3679       3468       21099         .7       -       3679       3468       21099         .9       -       2299       2187       11259         .9       -       2299       2187       11259         .4       -       9212       8934       27837         .4       -       3457       3246       21099         .9       -       2073       1968	E3100	30937	358.9	1	1764	1626	6879	1.66	Note 1
.8       -       3527       3389       6879         .8       -       1901       1763       6879         .8       -       1901       1763       6879         .9       -       1452       1302       7516         .1       -       1484       1334       7516         .1       -       1484       1334       7516         .3       -       4389       4239       7516         .5       -       2428       2536       6483         .2       -       2428       2278       7516         .9       -       1523       1373       7516         .9       -       4147       3936       21099         .7       -       3679       3468       21099         .9       -       2299       2187       11259         .9       -       2299       2187       11259         .4       -       9212       8934       27837         .4       -       3457       3246       21099         .9       -       2073       1968       10547	E3220	23077	267.7	ı	1315	1178	6879	1.59	Note 1
.8       -       1901       1763       6879         .5       -       1452       1302       7516         .1       -       1484       1334       7516         .3       -       4389       4239       7516         .5       -       2666       2536       6483         .2       2428       2278       7516         .2       -       2428       2278       7516         .0       -       1523       1373       7516         .9       -       4147       3936       21099         .7       -       3679       3468       21099         .7       -       3679       3468       21099         .9       -       2299       2187       11259         .9       -       1151       1054       9764         4.7       -       9212       8934       27837         4.7       -       3457       3246       21099         .4       -       2073       1968       10547	E3300	61875	717.8	ı	3527	3389	6839	3.46	Recom
.5       -       1452       1302       7516         .1       -       1484       1334       7516         .3       -       4389       4239       7516         .5       -       2666       2536       6483         .2       -       2428       2278       7516         .2       -       2428       2278       7516         .9       -       1523       1373       7516         .9       -       4147       3936       21099         .7       -       3679       3468       21099         .9       -       2299       2187       11259         .9       -       2299       2187       11259         .9       -       2299       2187       11259         .4       -       9212       8934       27837         .4       -       3457       3246       21099         .9       -       2073       1968       10547	E5100	33348	386.8	1	1901	1763	6879	1.80	Note 1
15.5       -       1452       1302       7516         12.1       -       1484       1334       7516         13.3       -       4389       4239       7516         12.5       -       2666       2536       6483         12.5       -       2428       2278       7516         15.0       -       1523       1373       7516         13.9       -       1523       1373       7516         14.9       -       1523       1373       7516         15.0       -       1447       3936       21099         14.3       -       4147       3936       21099         14.3       -       1151       11054       9764         34.3       -       1151       1054       27837         34.3       -       1151       1054       21099         33.4       -       3457       3246       21099         21.9       -       2073       1968       21099         11.9       -       10547       10547	CONDENSER WATER	R TEMPERATUI	RE RESET						
12.1       -       1484       1334       7516         13.3       -       4389       4239       7516         12.5       -       2666       2536       6483         13.2       -       2428       2278       7516         13.0       -       1523       1373       7516         13.9       -       4147       3936       21099         16.7       -       3679       3468       21099         16.7       -       5756       5514       24179         37.9       -       2299       2187       11259         34.3       -       1151       1054       9764         374.7       -       9212       8934       27837         33.4       -       3457       1868       10547         21.9       -       2073       1868       10547	E2100	25470	295.5	1	1452	1302	7516	1.54	Note 2
33.3     -     4389     4239     7516       12.5     -     2666     2536     6483       34.2     -     2428     2278     7516       310     -     1523     1373     7516       310     -     1523     1373     7516       43.9     -     4147     3936     21099       46.7     -     3679     3468     21099       46.7     -     5756     5514     24179       37.9     -     2299     2187     11259       34.3     -     1151     1054     9764       374.7     -     9212     8934     27837       33.4     -     3457     3246     21099       21.9     -     2073     1968     10547	E3081	26040	302.1	ı	1484	1334	7516	1.65	Note 2
12.5       -       2666       2536       6483         34.2       -       2428       2278       7516         310       -       1523       1373       7516         43.9       -       1523       1373       7516         43.9       -       4147       3936       21099         46.7       -       3679       3468       21099         47.3       -       5756       5514       24179         57.9       -       2299       2187       11259         34.3       -       1151       1054       9764         35.4       -       9212       8934       27837         33.4       -       3457       3246       21099         21.9       -       2073       1968       10547	E3220	77005	893.3	ì	4389	4239	7516	5.24	RECOM
14.2     -     2428     2278     7516       110     -     1523     1373     7516       110     -     1523     1373     7516       13.9     -     4147     3936     21099       143.9     -     4447     3468     21099       145.9     -     3679     3468     21099       171.3     -     5756     5514     24179       37.9     -     2299     2187     11259       34.3     -     1151     1054     9764       374.7     -     9212     8934     27837       33.4     -     3457     3246     21099       21.9     -     2073     1968     10547	E3244	02.29	542.5	Ì	5666	2536	6483	3.63	RECOM
110       -       1523       1373       7516         13.9       -       4147       3936       21099         18.7       -       3679       3468       21099         171.3       -       5756       5514       24179         57.9       -       2299       2187       11259         34.3       -       1151       1054       9764         374.7       -       9212       8934       27837         21.9       -       3457       3246       21099         21.9       -       2073       1968       10547	E3300	42600	494.2	1	2428	2278	7516	2.13	Note 2
13.9       -       4147       3936       21099         16.7       -       3679       3468       21099         17.3       -       5756       5514       24179         37.9       -       2299       2187       11259         34.3       -       1151       1054       9764         374.7       -       9212       8934       27837         33.4       -       3457       3246       21099         21.9       -       2073       1968       10547	E5100	26720	310	1	1523	1373	7516	1.28	RECOM
72750         843.9         -         4147         3936         21099           64540         748.7         -         3679         3468         21099           100970         1171.3         -         5756         5514         24179           40335         467.9         -         2299         2187         11259           20195         234.3         -         1151         1054         9764           161610         1874.7         -         9212         8934         27837           60640         703.4         -         3457         3246         21099           36370         421.9         -         2073         1968         10547	VARIABLE SPEED	TOWER FAN	DRIVES						
64540         748.7         -         3679         3468         21099           100970         1171.3         -         5756         5514         24179           40335         467.9         -         2299         2187         11259           20195         234.3         -         1151         1054         9764           161610         1874.7         -         9212         8934         27837           60640         703.4         -         3457         3246         21099           36370         421.9         -         2073         1968         10547	E2100	72750	843.9	1	4147	3936	21099	1.66	RECOM
100970     1171.3     -     5756     5514     24179       40335     467.9     -     2299     2187     11259       20195     234.3     -     1151     1054     9764       161610     1874.7     -     9212     8934     27837       60640     703.4     -     3457     3246     21099       36370     421.9     -     2073     1968     10547	E3081	64540	748.7	1	3679	3468	21099	1.53	RECOM
40335       467.9       -       2299       2187       11259         20195       234.3       -       1151       1054       9764         161610       1874.7       -       9212       8934       27837         60640       703.4       -       3457       3246       21099         36370       421.9       -       2073       1968       10547	E3100	100970	1171.3	1	5756	5514	24179	1.60	RECOM
20195     234,3     -     1151     1054     9764       161610     1874,7     -     9212     8934     27837       60640     703,4     -     3457     3246     21099       36370     421,9     -     2073     1968     10547	E3220	40335	467.9	•	2299	2187	11259	1.80	NOTE 3
161610     1874.7     -     9212     8934     27837       60640     703.4     -     3457     3246     21099       36370     421.9     -     2073     1968     10547	E3244	20195	234.3	1	1151	1054	9764	1.00	NOTE 3
60640         703.4         -         3457         3246         21099           36370         421.9         -         2073         1968         10547	E3300	161610	1874.7	•	9212	8934	27837	2.25	RECOM
36370 421.9 - 2073 1968 10547	E5100	60640	703.4	ı	3457	3246	21099	1.08	NOTE 3
	E5951	36370	421.9	1	2073	1968	10547	1.31	RECOM

SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1

	ANNUAL	ANNUAL ENERGY SAVINGS	NGS	T T T T T T T T T T T T T T T T T T T	Militar	17606		
BUILDING #	Electricity	ity	Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	SIR	REMARKS
	KWH	MBTU	MBTU	SAVINGS (*)	SAVINGS (8)	Ê		
	i							
VARIABLE SPEED CHILLED WATER PUMPS	CHILLED WATE	R PUMPS						
E2100	72750	843.9	1	4147	4008	13919	2.56	RECOM
E3081	85940	6.966	ı	4899	4689	20933	5.08	RECOM
E3100	101240	1174.4	1	5771	5540	23091	1.68	RECOM
E3220	121280	1406.8	1	6913	6648	26543	2.33	RECOM
E3300	161340	1871.5	1	9197	8918	27837	2.25	Note 4
E5100	121270	1406.7	ı	6913	8299	23452	2.00	RECOM
TOTALS FOR								
RECOMMENDED PROJECTS		1						
	1,250,555.0	14,506.5		71,286.0	68,449.0	262,051.0		

NOTE 1: This project is not recommended since it is synergistic with the V. S. CHW pump ECO and greater savings could be achieved by the latter.

NOTE 2: This project is not recommended since it is synergistic with the V. S. Cond fan ECO and greater savings could be achieved by the latter.

NOTE 3: This project is not recommended since it is synergistic with the condenser reset ECO and greater savings could be achieved by the latter.

This project is not recommended since it is synergistic with the chilled water temperature reset ECO and higher SIR value could be achieved by the latter. Note:

TABLE 1.8 (CONTINUED)

pg 3 of 4

SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1 (EDGEWOOD AREA)

	ANN	ANNUAL ENERGY SAVINGS	VINGS	ANALITA	1	TOTA			1
BUILDING #	Elect	Electricity	Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	SIR	REMARKS	
	KWH	MBTU	MBTU	CA) CONTARC		<b>.</b>			1
BOILER ECONOMIZER	ZER								
E3312 -#1	Ì	•	2123.3	15904	15562	34194	4.90	RECOM	
-#2	1	ı	1274.0	9542	9029	51294	2.18	RECOM	
<u> </u>	1	ì	1839.1	13775	13262	51294	3.19	RECOM	
E4160 -#1	٠	ı	384.4	2879	2675	20375	1.63	RECOM	
	;	1	594.1	4450	4246	20375	2.57	RECOM	,
-#3	•	f	262.8	1968	1765	20375	1.09	£	12
E5828 -#1	1	1	425.4	3186	2999	18746	2.64	RECOM	
	1	1	425.4	3186	2999	18746	2.10	RECOM	(
E6560 -#1	•	ſ	283.1	2120	1862	52869	1.07	뚶	500
-#2	•	ı	293.6	2199	1940	25869	1.11	ž	
BOILER TRIM CONTROLS	NTROLS								
E2100 -#3	ı	1	523.0	3917	3155	19058	2.01	RECOM	
E3312 -#1	•	ı	3058.8	22910	22148	19058	12.55	RECOM	
	1	,	1150.6	8618	7855	19058	5,15	RECOM	
-#3	1	ı	776.9	5819	5056	19058	3.36	RECOM	
E4160 -#1	•	1	674.9	5055	4293	19058	2.87	RECOM	
-#2	1	ı	439.9	3295	2533	19058	1.74	RECOM	
E3302 -#1	•	•	441.6	3307	2545	19058	2.37	RECOM	
E5828 -#1	•	•	237.2	1776	1014	19058	1.07	S.	50
-#2	1	ı	447.5	3352	2590	19058	1.89	RECOM	

TABLE 1.8 (CONTINUED)

pg 4 of 4

SUMMARY OF ALL ENERGY CONSERVATION OPPORTUNITIES HAVING SIR > 1

	ANNUAL EN	ANNUAL ENERGY SAVINGS	33	INTERNA	ANNIAL	70741		
BUILDING #	Electricity		Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	SIR	REMARKS
	KWH MBTU	 1.0	MBTU	SAVINGS (*)	CAVINGS (*)			
COMBUSTION AIR FROM CEILING	ROM CEILING							
E3312 -#1	•		203.3	1523	1445	7767	2.02	RECOM
-#2	ı		178.4	1336	1254	8269	1.88	RECOM
<u>6</u>	ı		220.9	1655	1572	8269	2.35	
E4160 -#1,2,3	ı		204.7	1533	1380	15336	1.13	NR 1/.
E3302 -#1	•		183.9	1377	1300	7766	2.76	RECOM
E5828 -#1	ı		44.6	334	287	4664	1.05	) W
INSTALLATION OF NEW BURNER EQUIPMENT	NEW BURNER EQ	UIPMENT						
E3312 -#1	t		2794.0	20927	22193	126632	1.86	RECOM
SMALL BOILER APPLICATION	PLICATION							
E3302	t		4400.0	33000	28878	203911	2.75	RECOM
REDUCTION IN MAKEUP WATER QUANTITY	KEUP WATER QUA	NTITY						
E5126	-29120	-337.8	13412.4	00886	97176	646900	2.79	currently
BOILER REPLACEMENT STUDY	ENT STUDY							2011
E5126 -#1 T0 5	ı		70343.3	526871	545077	1,820,569	5.46	RECOM
TOTALS FOR RECOMMENDED			(20)		3/2 &	-		
PROJECTS	(29,120.0)	(337.8)	92,902.7	695,884.0	702,666.0	2,550,671.0	8	
				,	,			

### 1.4 RECOMMENDED PROJECTS

A list of all projects recommended is shown in Table 1.9.

The projects recommended are grouped into five PECIP projects and one locally funded project. These are:

PECIP #1: Boiler Trim Controls

PECIP #2: Boiler Economizer

PECIP #3: New Boiler Installation (E3302, E5126)

PECIP #4: Miscellaneous Boiler Projects

(Boiler Blowdown, Installation of New Burner)

PECIP #5: Miscellaneous Chiller Projects

Locally funded project: Combustion air from ceiling

Each of the above five PECIP projects has total investment exceeding \$100,000 and a combined payback period of less than four years. The only project not meeting PECIP or ECIP guidelines is: Combustion Air from the Ceiling. This project has SIR value greater than one, but payback of more than four years and total investment below \$100,000. As suggested by the base, this project should be locally funded and no documentation is required.

The total savings resulting from these projects are:

Total Annual Energy Savings, Electricity = 1,326,775 KWH

or

15,391 MBTU

Fuel Oil = 133,173 MBTU

• Total Annual Source Energy Savings = 148,564 MBTU

• Total Investment Required = \$3,442,090

Total Annual Energy Cost Savings = \$1,073,367

• Annual Dollar Savings = \$1,069,295

• Simple Payback = 3.2 years

• Annual Base-wide Energy Cost = \$22,457,600

• Percent Energy Cost Savings = 4.8%

The five PECIP projects are separately documented and bound. The proposed operational date for these projects is October, 1988.

TABLE 1.9

PROJECTS RECOMMENDED CONSIDERING SYNERGISM

		ANNUAL	ANNUAL ENERGY SAVINGS	INGS		1	. E	1 1001 5	
PROJECT	BUILDING #	Electricity	icity	Fuel Oil	ENERGY COST	ANNUAL DOLLAR	INVESTMENT	PAYBACK (VDC)	SIR
NAME ,	'	KWH	MBTU	MBTU	SAVINGS (*)		(*)	Cui	
PECIP PROJECT # 1 :									
	1								
BLR TRIM CONTROLS	E 3312 -#1	1	•	3,059	22,910	22,148	19,058	0.9	12.55
	345 -#1,2,3	1		11,373	85, 185	85,898	57,176	0.7	12.14
	2915 -#2	,	•	1,940	14,530	13,767	19,058	1.4	99.9
	E 3312 -#2			1, 151	8,618	7,855	19,058	2.4	5.15
	2502 -#1	,	•	1,744	13,066	12,303	19,058	1.5	4.35
	E 3312 -#3	,		777	5,819	5,056	19,058	3.8	3.36
	2502 -#2	•	ı	1,213	9,084	8,322	19,058	2.3	$\frac{2.95}{1}$
	E 4160 -#1	ı	•	675	5,055	4,293	19,058	4.4	2.87
	E 3302 -#1	•	1	442	3,307	2,545	19,058	7.5	2.37
	E 2100 -#3	1		523	3,917	3,155	19,058	6.0	2.01
	E 5828 -#2	1	1	448	3,352	2,590	19,058	7.4	1.89
E 4160 -#2	E 4160 -#2	ı	ı	440	3,295	2,533	19,058	7.5	1.74
									l
TOTAL		•	ı	23,784	178,138	167,465	266,814	1.6	

TABLE 1.9(CONTD)

PROJECTS RECOMMENDED CONSIDERING SYNERGISM

		ANNUAL	ANNUAL ENERGY SAVINGS	INGS			14 10 1	i idai s	
PROJECT	BUILDING #	Electricity	ci ty	Fuel Oil	ENERGY COST	DOLLAR	INVESTMENT	PAYBACK	SIR
NAME		KWH	MBTU	MBTU	SAVINGS (*)	CANINGS (\$)		(IR3)	
PECIP PROJECT # 2									
	ļ								
BOILER ECONOMIZER	E 3312 -#1	1		2,123	15,904	15,562	34,194	2.2	4.90
	345 -41,243	ı	1	16,329	122,302	119,574	272,767	2.3	3.67
	E 3312 -#3	ı	,	1,839	13,775	13,262	51,294	3.9	3.19
	E 5828 -#1	1		425	3,186	2,999	18,746	6.3	2.64
	E 4160 -#2	1	•	594	4,450	4,246	20,375	4.8	2.57
	4219 -#4	ı	•	292	2,186	2,041	14,470	7.1	2.24
	E 3312 -#2	ı		1,274	9,542	9,029	51,294	5.7	2.18
	E 5828 -#2	ı	•	425	3,186	2,999	18,746	6.3	2.10
	2915 -#1	1	,	751	5,625	5,379	24,626	4.6	2.02
	-#2	ı	1	725	5,430	5,184	24,626	4.8	1.94
	2352 -#1	1	Ą	246	1,842	1,683	15,903	9.4	1.76
	E 4160 -#1	ı	•	384	2,879	2,675	20,375	7.6	1.63
	5206 -#2	1	ı	260	4,193	3,943	24,986	6.3	1.33
	2502 -#3	1	,	271	2,032	1,887	14,470	7.7	1.32
	-								
				1					1
TOTAL		•	1	26,240	196,532	190, 463	606,872	3.2	

TABLE 1.9(CONTD)

PROJECTS RECOMMENDED CONSIDERING SYNERGISM

		ANNUAL	ANNUAL ENERGY SAVINGS	INGS	11111111	T T T T T T T T T T T T T T T T T T T	1400	G IGNI	
PROJECT	BUILDING #	Electr	Electricity	Fuel Oil	ENERGY COST	DOLLAR CAUINGE (4)	INVESTMENT	PAYBACK (VDC)	SIR
NAME	i	K	MBTU	MBTU	CSNIASC	(A) CONTACE		(185)	
PECIP PROJECT # 3	••								
BLR REPLACEMENT	E5126 - # 1-5	•	ì	70,343	526,871	545,077	1,820,569	3.3	5.46
SMALL BOILER APPL E 3302	E 3302	1		4,400	33,000	28,878	203,911	7.1	2.75
TOTALS		-	1	74,743	559,871	573,955	2,024,480	3.5	
PECIP PROJECT # 4	<del></del>								
BOILER BLOWDOWN	345 -#1,2&3	t ·	•	1,121	8,396	8,238	15,835	1.9	4.35
NEW BURNER	2915 -#182 E 3312 -#1	1 1	1 1	3,705	27,754 20,927	28,608 22,193	85,378 126,632	3.0	3.05 1.86
TOTALS		'	1	7,620	57,077	59,039	227,845	3.9	

TABLE 1.9 (contd)

PROJECTS RECONNENDED CONSIDERING SYNERGISM

PROJECT BUILDING 4 Electr  NAME  RWH  CDW RESET E 3220 77,005  E 324 46,770  E 5100 26,720  CHM RESET E 3300 61,875  V.S. TOWER FAN E 3300 161,610  E 2100 72,750  E 3081 64,540  E 3080 100,970  E 3081 64,540  E 3081 84,540  E 3081 85,940  E 5081 85,940  E 5081 121,280	Electricity H MBTU	Fuel Oil MBTU	ENERGY COST	HANDAL	LUIRL	SIMPLE	
5: E 3220 E 3244 E 5100 E 5100 E 5100 E 5951 E 5951 E 5951 E 5951 E 5951 E 5951 E 5951	UBBIO	MBTU	147 001121100	DULLAR	INVESTMENT	PAYBACK	SIR
5: E 3220 E 3244 E 5100 E 5300 E 5300 E 5100 E 5951 E 5951 E 5951 E 5951 E 5951			SAVINOS (*)	SAVINDS (\$)	ŝ	(TRD)	
E 3220 E 3244 E 5100 E 3300 E 3300 E 3100 E 3081 E 5951 E 3220 E 3081		1 1 1 1 1 1 1 1 1					1 1 1 1 1 1 1
E 3244 E 5100 E 5300 E 5300 E 5100 E 5100 E 5951 E 5951 E 5951 E 5000 E 5000		,	4,389	4,239	7,516	8.1	5.24
E 5100 E 3300 E 3300 E 3100 E 3081 E 5951 E 2100 E 3081 E 500	0 543	t	2,666	2,536	6,483	2.6	3.63
E 3300 E 5300 E 2100 E 3100 E 3081 E 5951 E 3220 E 3081		•	1,523	1,373	7,516	5.5	1.28
E 3300 E 2100 E 3100 E 3081 E 5951 E 2100 E 3220 E 3081	5 718	ı	3,527	3,389	6,879	2.0	3.50
E 2100 E 3100 E 3081 E 5951 E 2100 E 3220 E 3081	_	•	9,212	8,934	27,837	3.1	2.25
E 3100 E 3081 E 5951 E 2100 E 3220 E 3081 E 5100	10 B44	1	4,147	3,936	21,099	5.4	1.66
E 5951 E 5951 E 2100 E 3220 E 3081 E 5100		1	5,756	5,514	24,179	4.4	1.60
E 5951 E 2100 E 3220 E 3081 E 5100		•	3,679	3,468	21,099	6.1	1.53
E 2100 E 3220 E 3081 E 5100		•	2,073	1,968	10,547	5.4	1.31
E 3220 E 3081 E 5100	90 B44	ı	4,147	4,008	13,919	3.5	2.56
		ı	6,913	6,648	26,543	4.0	2.33
		1	4,899	4,689	20,933	4.5	2.08
		į	6,913	6,678	23,452	3.5	2.00
	1,174	1	5,771	5,540	23,091	4.2	1.68
		ı	4,573	4,353	21,957	5.0	1.39
1,227,310	14,237	0	70,188	67,273	263,050	3.9	

TABLE 1.9(CONTD)

PROJECTS RECOMMENDED CONSIDERING SYNERGISM

		ANNUA	ANNUAL ENERGY SAVINGS	INGS	ANIMITAT	ANNIAI	TOTAL	CINDIF	
PROJECT	BUILDING #	Elect	Electricity	Fuel Oil	ENERGY COST	DOLLAR CAUINGS (4)	INVESTMENT	PAYBACK (VRS)	SIR
NAME		KWH	MBTU	MBTU	(*) CONTINUE				
LOCAL FUNDING :									
	!								
COMB AIR FROM CLG	E 3302 -#1	ı	1	184	1,377	1,300	7,766	6.0	2.76
	E 3312 -#3	ı	ı	221	1,655	1,572	8,269	5,3	2.35
	E 3312 -#1	•	ı	203	1,523	1,445	7,767	5.4	2.02
E 3312	E 3312 -#2	ı	•	178	1,336	1,254	8,269	9.9	1.88
TOTALS		•	'	787	5,891	5,571	32,071	5.8	